

I. AMENDMENTS TO THE CLAIMS:

Please cancel claims 4, 12-14, 27 and 28 without prejudice. Kindly amend claims 5-8 and 15-26, and add new claims 29-34 as follows.

The following claims will replace all prior listing, or versions, of claims in the present application.

LISTING OF CLAIMS:

1. (Previously Presented) A data processing method for extracting a subset from tabular format data viewed as an array of records, each record including item values belonging to items, the method comprising the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of the records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(d) creating a second value list storing value elements contained in the item value number array and a second pointer array storing position elements indicating elements in the second value list corresponding to the record numbers by referring to the item value number array, wherein

a value in the first value list is specified from a record number of the ordered set array through a first element in the second pointer array at a position indicated by the record number and a second element in the second value list at a position indicated by the first element in the second pointer array.

2. (Previously Presented) The data processing method according to claim 1, wherein the step of creating the second value list and the step of creating the second pointer array include the steps of:

sorting elements in the item value number array, creating a third array in a state where a duplicate value is excluded, and substituting the created third array for the second value list; and

creating the second pointer array by converting the elements in the item value number array to reflect the sort of the elements in the item value number array and the exclusion of the duplicate value.

3. (Previously Presented) A data processing method for extracting a subset from tabular format data viewed as an array of records, each record including item values belonging to items, the method comprising the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(d) specifying a value in the first value list from a record number of the ordered set array through an element in the item value number array at a position indicated by the record number.

4. (Cancelled)

5. (Currently Amended) A retrieval method using the ~~second pointer array, or the second value list, or the second pointer array and the second value list~~ created by the data processing method according to claim 1, wherein the retrieval method comprises the steps of:

specifying an element indicating an item value as a retrieval object among elements in the second value list;

arraying a value indicating that a flag is on at a position corresponding to a position of the specified element in a flag array having the same size as the second value list;

specifying an element of the second pointer array indicated by a record number in the ordered set;

referring to a state of a flag at a position indicated by an element of the second pointer array in the flag array; and

successively arranging the record number into a newly provided ordered set array for output in a case where the state of the flag is on.

6. (Currently Amended) An aggregation method using ~~the second pointer array, or the second value list, or the second pointer array and the second value list~~ created by the data processing method according to claim 1, wherein the aggregation method comprises the steps of:

creating a classification number array in which a classification number indicating a category of a value is arranged correspondingly to an element of the second value list;

specifying a record number in the ordered set array corresponding to the specified classification number; and

performing aggregation using a predetermined value list item value indicated by the specified record number.

7. (Currently Amended) A sort method using ~~the second pointer array, or the second value list, or the second pointer array and the second value list~~ created by the data processing method according to claim 1, wherein the sort method comprises the steps of:

calculating an existence number as the number of elements indicated by the second pointer array for each value of the second value list;

creating, based on the existence number, a cumulative number array corresponding to a value of the second value list and indicating a head position at which a record number in the ordered set array is to be arranged; and

referring to the cumulative array and arranging a record number of the ordered set array into an array for output so that a sort order of the item values in the second value list is reflected.

8. (Currently Amended) A method of joining tabular format data by using the ~~second pointer array, or the second value list, or the second pointer array and the second value list~~ in the information block relating to each of plural tabular format data created by the data processing method according to claim 1, wherein the method of joining tabular format data comprises that steps of:

finding an item to be shared in each of the plural tabular format data;

equating item values in the second value list of the information block relating to the item; and

in response to equating the item values, updating an element in the second pointer array in each of the information blocks in accordance with a change in arrangement of the item values.

9. (Previously Presented) A data processing program stored in memory of a computer and operating the computer to extract a subset from tabular format data viewed as an array of records, each record including item values belonging to items, wherein the data processing program causes the computer to execute the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of the records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(d) creating a second value list storing value elements contained in the item value number array and a second pointer array storing position elements indicating elements in the second value list corresponding to the record numbers by referring to the item value number array, wherein

the computer operates so that a value in the first value list is specified from a record number of the ordered set array through a first element in the second pointer array at a position indicated by the record number and a second element in the second value list at a position indicated by the first element in the second pointer array.

10. (Previously Presented) The data processing program according to claim 9, wherein

when creating the second value list and the second pointer array, the computer is made to execute the steps of:

sorting the elements in the item value number array, creating a third array in a state where a duplicate value is excluded, and substituting the created third array for the second value list; and

creating the second pointer array by converting the elements in the item value number array to reflect the sort of the elements in the item value number array and the exclusion of the duplicate value.

11. (Previously Presented) A data processing program stored in memory of a computer and operating the computer to extract a subset from tabular format data viewed as

an array of records, each record including item values belonging to items, wherein the data processing program causes the computer to execute the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of the records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(d) the computer is operated to specify a value in the first value list from a record number of the ordered set array through an element in the item value number array at a position indicated by the record number.

12. (Cancelled)

13. (Cancelled)

14. (Cancelled)

15. (Currently Amended) A retrieval method using the ~~second pointer array, or the second value list, or the second pointer array and the second value list~~ created by the data processing method according to claim 2, wherein the retrieval method comprises the steps of:

specifying an element indicating an item value as a retrieval object among elements in the second value list;

arraying a value indicating that a flag is on at a position corresponding to a position of the specified element in a flag array having the same size as the second value list;

specifying an element of the second pointer array indicated by a record number in the ordered set;

referring to a state of a flag at a position indicated by an element of the second pointer array in the flag array; and

successively arranging the record number into a newly provided ordered set array for output in a case where the state of the flag is on.

16. (Currently Amended) A retrieval method using ~~the first pointer array, or the first value list, or the first pointer array and the first value list~~ created by the data processing method according to claim 3, wherein the retrieval method comprises the steps of:

specifying an element indicating an item value as a retrieval object among elements in the first value list;

arraying a value indicating that a flag is on at a position corresponding to a position of the specified element in a flag array having the same size as the first value list;

specifying an element of the first pointer array indicated by a record number in the ordered set;

referring to a state of a flag at a position indicated by an element of the first pointer array in the flag array; and

successively arranging the record number into a newly provided ordered set array for output in a case where the state of the flag is on.

17. (Currently Amended) A retrieval method using ~~the first pointer array, or the first value list, or the~~ second~~first~~ pointer array and the second~~first~~ value list created by the data processing method according to claim 2~~claim 4~~, wherein the retrieval method comprises the steps of:

specifying an element indicating an item value as a retrieval object among elements in the second~~first~~ value list;

arraying a value indicating that a flag is on at a position corresponding to a position of the specified element in a flag array having the same size as the second~~first~~ value list;

specifying an element of the second~~first~~ pointer array indicated by a record number in the ordered set;

referring to a state of a flag at a position indicated by an element of the second~~first~~ pointer array in the flag array; and

successively arranging the record number into a newly provided ordered set array for output in a case where the state of the flag is on.

18. (Currently Amended) An aggregation method using ~~the second pointer array, or the second value list, or the second pointer array and the second value list~~ created by the data processing method according to claim 2, wherein the aggregation method comprises the steps of:

creating a classification number array in which a classification number indicating a category of a value is arranged correspondingly to an element of the second value list;

specifying a record number in the ordered set array corresponding to the specified classification number; and

performing aggregation using a predetermined value list item value indicated by the specified record number.

19. (Currently Amended) An aggregation method using ~~the first pointer array, or the first value list, or the first pointer array and the first value list~~ created by the data processing method according to claim 3, wherein the aggregation method comprises the steps of:

creating a classification number array in which a classification number indicating a category of a value is arranged correspondingly to an element of the first value list;

specifying a record number in the ordered set array corresponding to the specified classification number; and

performing aggregation using a predetermined value list item value indicated by the specified record number.

20. (Currently Amended) An aggregation method using ~~the first pointer array, or the first value list, or the first pointer array and the~~ second first value list created by the data processing method according to claim 29~~claim 4~~, wherein the method comprises the steps of:

creating a classification number array in which a classification number indicating a category of a value is arranged correspondingly to an element of the second~~first~~ value list;

specifying a record number in the ordered set array corresponding to the specified classification number; and

performing aggregation using a predetermined value list item value indicated by the specified record number.

21. (Currently Amended) A sort method using ~~the second pointer array, or the second value list, or the second pointer array and the second value list~~, created by the data processing method according to claim 2, wherein the sort method comprises the steps of:

calculating an existence number as the number of elements indicated by the second pointer array for each value of the second value list;

creating, based on the existence number, a cumulative number array corresponding to a value of the second value list and indicating a head position at which a record number in the ordered set array is to be arranged; and

referring to the cumulative array and arranging a record number of the ordered set array into an array for output so that a sort order of the item values in the value list is reflected.

22. (Currently Amended) A sort method using ~~the first pointer array, or the first value list, or the first pointer array and the first value list~~ created by the data processing method according to claim 3, wherein the sort method comprises the steps of:

calculating an existence number as the number of elements indicated by the first pointer array for each value of the first value list;

creating, based on the existence number, a cumulative number array corresponding to a value of the first value list and indicating a head position at which a record number in the ordered set array is to be arranged; and

referring to the cumulative array and arranging a record number of the ordered set array into an array for output so that a sort order of the item values in the value list is reflected.

23. (Currently Amended) A sort method using ~~the first pointer array, or the first value list, or the second first pointer array and the second first value list~~ created by the data processing method according to claim 29~~claim 4~~, wherein the sort method comprises the steps of:

calculating an existence number as the number of elements indicated by the ~~second~~first pointer array for each value of the ~~second~~first value list;

creating, based on the existence number, a cumulative number array corresponding to a value of the ~~second~~first value list and indicating a head position at which a record number in the ordered set array is to be arranged; and

referring to the cumulative array and arranging a record number of the ordered set array into an array for output so that a sort order of the item values in the value list is reflected.

24. (Currently Amended) A method of joining tabular format data by using the ~~second pointer array, or the second value list, or the second pointer array and the second value list~~ in the information block relating to each of plural tabular format data created by the data processing method according to claim 2, wherein the method of joining tabular format data comprises:

finding an item to be shared in each of the plural tabular format data;

equating item values in the second value list of the information block relating to the item; and

in response to equating the item values, updating an element in the second pointer array in each of the information blocks in accordance with a change in arrangement of the item values.

25. (Currently Amended) A method of joining tabular format data by using the ~~first pointer array, or the first value list, or the first pointer array and the first value list~~ in the information block relating to each of plural tabular format data created by the data processing

method according to claim 3, wherein the method of joining tabular format data comprises the steps of:

finding an item to be shared in each of the plural tabular format data;

equating item values in the first value list of the information block relating to the item; and

in response to equating the item values, updating an element in the first pointer array in each of the information blocks in accordance with a change in arrangement of the item values.

26. (Currently Amended) A method of joining tabular format data by using ~~the first pointer array, or the first value list, or the~~ second first pointer array and the second first value list in the information block relating to each of plural tabular format data created by the data processing method according to claim 29~~claim 4~~, wherein the method of joining tabular format data comprises the steps of:

finding an item to be shared in each of the plural tabular format data;

equating item values in the second first value list of the information block relating to the item; and

in response to equating the item values, updating an element in the second first pointer array in each of the information blocks in accordance with a change in arrangement of the item values.

27. (Cancelled)

28. (Cancelled)

29. (NEW) A data processing method for extracting a subset from tabular format data viewed as an array of records, each record including item values belonging to items, the method comprising the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of the records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) comparing a size of the ordered set array with a size of the first value list, wherein, as a result of the comparison, when size of the ordered set array is smaller than the size of the first value list at a predetermined rate, then steps (d) and (e), are performed;

(d) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(e) creating a second value list storing value elements contained in the item value number array and a second pointer array storing position elements indicating elements in the second value list corresponding to the record numbers by referring to the item value number array, wherein

a value in the first value list is specified from a record number of the ordered set array through a first element in the second pointer array at a position indicated by the record number and a second element in the second value list at a position indicated by the first element in the second pointer array.

30. (NEW) A data processing program stored in memory of a computer and operating the computer to extract a subset from tabular format data viewed as an array of records, each record including item values belonging to items, wherein the data processing program causes the computer to execute the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of the records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) comparing a size of the ordered set array with a size of the first value list, wherein, as a result of the comparison, when size of the ordered set array is smaller than the size of the first value list at a predetermined rate, then the program makes the computer execute steps (d) and (e);

(d) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(e) creating a second value list storing value elements contained in the item value number array and a second pointer array storing position elements indicating elements in the second value list corresponding to the record numbers by referring to the item value number array, wherein

the computer operates so that a value in the first value list is specified from a record number of the ordered set array through a first element in the second pointer array at a position indicated by the record number and a second element in the second value list at a position indicated by the first element in the second pointer array.

31. (NEW) A data processing method for extracting a subset from tabular format data viewed as an array of records, each record including item values belonging to items, the method comprising the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of the records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) comparing a size of the ordered set array with a size of the first value list, wherein, as a result of the comparison, when size of the ordered set array is smaller than the size of the first value list at a predetermined rate, then steps (d) and (e), are performed;

(d) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(e) creating a second value list storing value elements contained in the item value number array and a second pointer array storing position elements indicating elements in the second value list corresponding to the record numbers by referring to the item value number

array, wherein a value in the first value list is specified from a record number of the ordered set array through a first element in the second pointer array at a position indicated by the record number and a second element in the second value list at a position indicated by the first element in the second pointer array, wherein the step of creating the second value list and the step of creating the second pointer array include the steps of

- i. sorting elements in the item value number array;
- ii. creating a third array in a state where a duplicate value is excluded, and substituting the created third array for the second value list; and
- iii. creating the second pointer array by converting the elements in the item value number array to reflect the sort of the elements in the item value number array and the exclusion of the duplicate value.

32. (NEW) A data processing method for extracting a subset from tabular format data viewed as an array of records, each record including item values belonging to items, the method comprising the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) comparing a size of the ordered set array with a size of the first value list, wherein, as a result of the comparison, when size of the ordered set array is smaller than the size of the first value list at a predetermined rate, then steps (d) and (e) are performed;

(d) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(e) specifying a value in the first value list from a record number of the ordered set array through an element in the item value number array at a position indicated by the record number.

33. (NEW) A data processing program stored in memory of a computer and operating the computer to extract a subset from tabular format data viewed as an array of records, each record including item values belonging to items, wherein the data processing program causes the computer to execute the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of the records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) comparing a size of the ordered set array with a size of the first value list, wherein, as a result of the comparison, when size of the ordered set array is smaller than the size of the

first value list at a predetermined rate, then the program makes the computer execute steps (d) and (e);

(d) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(e) creating a second value list storing value elements contained in the item value number array and a second pointer array storing position elements indicating elements in the second value list corresponding to the record numbers by referring to the item value number array, wherein the computer operates so that a value in the first value list is specified from a record number of the ordered set array through a first element in the second pointer array at a position indicated by the record number and a second element in the second value list at a position indicated by the first element in the second pointer array, and

wherein when creating the second value list and the second pointer array, the computer is made to execute the steps of

i. sorting the elements in the item value number array, creating a third array in a state where a duplicate value is excluded, and substituting the created third array for the second value list; and

ii. creating the second pointer array by converting the elements in the item value number array to reflect the sort of the elements in the item value number array and the exclusion of the duplicate value.

34. (NEW) A data processing program stored in memory of a computer and operating the computer to extract a subset from tabular format data viewed as an array of records, each record including item values belonging to items, wherein the data processing program causes the computer to execute the steps of:

(a) constructing the tabular format data by creating information blocks corresponding to respective items, each information block including a first value list in which the item values are stored in order of item value numbers corresponding to the item values and a first pointer array in which pointer values indicating the item value numbers are stored in order of unique record numbers;

(b) creating an ordered set array containing record numbers of records selected from the array of the records, wherein the selected record numbers are arranged in a specified order in the ordered set array;

(c) comparing a size of the ordered set array with a size of the first value list, wherein, as a result of the comparison, when the size of the ordered set array is smaller than the size of the first value list at a predetermined rate, the computer is made to execute the steps (d) and (e);

(d) arranging a pointer value in the first pointer array at a position indicated by each of the record numbers of the ordered set array into an item value number array at a position corresponding to a position where the record number is arranged in the ordered set array; and

(e) the computer is operated to specify a value in the first value list from a record number of the ordered set array through an element in the item value number array at a position indicated by the record number.